The Failure of Universities to Produce Conservation Biologists

Ten years ago, like most students finishing their PhDs, I was eagerly shipping off applications to scores of universities, hoping to settle in soon to a lifetime in academia. The only difference between me and most of my fellow students was that, prior to beginning PhD work, I had been gainfully employed for several years after completing my Masters degree, first in a state agency and then by The Nature Conservancy. This was in addition to a couple years of professional work (mostly teaching) before my Masters education. I had hoped my professional experience would be seen as at least equivalent to a multi-year, postdoctoral appointment and would aid my search for academic jobs. I assumed my diverse teaching background prepared me well for a job in higher education. I also believed my multi-disciplinary training in animal and plant ecology, as opposed to narrow specialization, would come in handy for educating students in the increasingly broad fields of applied ecology and conservation biology.

I was wrong on all counts. I never landed an academic job. In those cases where I found out why, it appears that I was seen as too much of a generalist and hence not capable of focusing intensively on a narrowly-defined research topic. What came as a real surprise was that my job experience in government agencies, outdoor schools, and NGOs, far from being an asset, was a liability. This was my first conscious exposure to the prejudice of many academics that non-university scientists are second-rate scholars not bright enough to enter the ivory tower. It was also the first time I realized that being a generalist and a naturalist—and even worse, a conservation activist!—does not win points in academic job competitions.

In my case, things turned out all right. My non-academic experience paid off for landing contracts and grants as a self-employed consultant, and perhaps even for being named editor of this journal and president-elect of this society. But I worry that other graduates may not be faring so well. What happens to those narrowly-trained PhDs who lack experience outside the university and are faced with an increasingly tight academic job market? What happens to all those students who enter graduate school wanting to devote their careers to applied work in conservation biology? What steps have the universities taken to train graduate students for professional jobs outside academia? Are students given plenty of opportunities to gain outside experience? Are students receiving broad, interdisciplinary training, or are they still being forced to focus on narrow research topics? Are faculty members who engage in real-world conservation work rewarded by their peers, for example by promotion and tenure committees? Is the academic prejudice against agencies and NGOs breaking down?

I choose this topic for my parting editorial because I believe that one of the major shortcomings of conservation biology today is its domination by academic scientists who have little experience outside the university and are ill-prepared to train students for the current job market. A related, and more pernicious, problem is the superior attitude that some academics display toward their true peers outside the university. Despite the flurry of new programs in conservation biology, most universities treat conservation biology, applied ecology, and related fields as, at best, academic exercises that provide a few new sources of research dollars. Many university departments—especially the traditional resource disciplines such as fisheries, wildlife, range management, and forestry—are closely tied to industry or hook-and-bullet recreation and treat conservation biology with anxiety or disdain. In some universities these departments have successfully fought implementation of interdisciplinary programs in conservation biology, ostensibly because they already have the subject covered within their curricula. (I suspect the real reason may be the envy and fear among those in resource management fields that conservation biology has stolen the professional spotlight from them. In one department I know of, highly experienced conservation biologists are relegated to "courtesy" status and are not considered competent to advise graduate students, yet are requested to teach introductory courses without pay.) With few exceptions, universities fail to train graduate students for problem-solving outside academia, largely because the professors themselves have no experience elsewhere. I see no evidence that these problems have lessened in the 10 years since I received my PhD.

Ecologists and conservation biologists are beginning to express concern about the failure of graduate pro-
programs to train students for today's jobs. Earlier this year I initiated a discussion on the ECOLOG—the internet discussion group of the Ecological Society of America—with the following post:

We are not training ecologists and conservation biologists for the current job market . . . most jobs for PhDs in these fields are or soon will be in agencies (although this market has fallen some recently), consulting firms, NGOs (e.g., conservation groups, land trusts, etc.), or free-lancing. Some strongly emerging fields of specialisation—for example, "conservation planning"—are virtually ignored in most university curricula. We are still training students to be little professors, and this does them a serious disservice. I have no figures to back up these claims . . . so let's call them hypotheses. But I think they are hypotheses worth acting on by changing curricula—which also means hiring faculty who have unconventional (non-academic) backgrounds to teach students what they need to learn. My personal experience is that universities don't want to hire people with experience in real-world conservation and management, and jobs in the real world are not well filled by people with purely academic backgrounds.

The response to my post was voluminous and in agreement, suggesting that these problems are widespread and are not being solved by the recent proliferation of conservation biology and environmental studies programs, much less by the traditional resource management disciplines or basic biological sciences. Here are some examples of responses on the ECOLOG:

Our universities do not seem to be turning out students for the job market. I have observed that biology/ecology/wildlife dissertation research seems to occupy 50% to 80% of a student's time in a graduate program. Most often, the topic of research must encompass what is termed "original science," an area that often excludes the political solution of resource issues by creative compromise, or the application of management knowledge to develop land management plans, or other areas involving "people skills." The majority of a student's time is not spent in broadening, but rather in specialization in the narrowest of areas, and mostly avoiding the development of skills necessary to solve the most pressing environmental problems. (Brian Pilcher)

The bulk of potential PhD students are well aware of the job market they're likely to face when they earn their degree. Many may privately be preparing themselves for non-academic careers, or at least reconciling themselves to one. But I've talked with PhD candidates in this position, who would never let their lab know they were considering other routes. To do so, they feel, would lower the esteem with which they are held . . . More ominously, they feel that their advisor would provide them with less care, feeding, and attention if it were known they planned deliberately to leave academia . . . I would argue that just as there are political decision makers who think they understand the biological world but don't, there are scientists who think they understand the political world but don't—and that academic scientists had better start being more willing to train non-academics if they wish to retain their funding in an increasingly short-term world. (David James)

Although PhDs certainly get jobs in . . . non-academic areas, they are generally not being given appropriate training for them. My program is unusual in that it provides multidisciplinary training specifically targeted for non-academic positions, and gives a "professional" doctorate. I don't see this sort of focus in biology departments, or even the recognition that non-academic jobs are an acceptable endpoint. (Richard Ambrose)

We find that curricula are so specialized, with little room for electives, that students are graduating with few marketable skills and are not well-rounded . . . We would very much like to see biology/ecology students, especially those seeking jobs outside of academia, with some cross training in such skills as surveying, management, more mathematics and statistics, and some level of engineering understanding. (Mary Landin)

As an ecologist and project manager employed in the natural resources group of a consulting firm, and reviewer of prospective employees, I can list . . . selection criteria which I like to use for prospective employees, which so far have led to the happiness of both employee and employer (not necessarily in order of importance): 1) passion for a specific field of interest, in this case ecology or a related discipline such as botany or hydrology; yet 2) diversity of experience—the person is not overly specialised and is genuinely interested in broadening their range of expertise; 3) science education—the person understands the scientific method and appropriate use of statistical methods; 4) appreciation of human diversity and viewpoints . . . 5) advanced degree (masters or doctorate) helps, (as it) indicates ability to write (very important in environmental work). (Edith Read)

It is difficult for academics to train students for non-academic jobs when they themselves have no experience outside of academia. I have recently received my PhD but prior to doing so I had gained about 10 years of professional experience. I was told by most that this experience was worthless; this of course came from people who were younger and had less professional experience but were now professors. What I found . . . even worse was the lack of communication skills by many to even work with professionals outside of academics. We must understand that not all students are headed for academia, and we must give them the skills to pursue a variety of career opportunities. (Bob Whyte)

These observations come from individuals both inside and outside academia. It seems clear (though apparently not to most university administrators) that life science curricula need to be radically reformed to match today's students with today's and tomorrow's jobs. To this end, I offer the following specific suggestions—along with some recognition of barriers—for bringing conservation biology into the 21st century by training students for the challenges ahead:

- Break down disciplinary walls. The rigid territoriality and identity consciousness of department chairs are major impediments to effective interdisciplinary training. Higher-level university administrators should persuade uncooperative department chairs to diversify their programs and participate in cross-disciplinary curricula, or remove them from their posts.
- Develop truly interdisciplinary degree programs that are scientifically rigorous. This is something that, in the United States, the National Science Foundation (NSF) might sponsor. Indeed, NSF recently requested proposals for its Integrative Graduate Education and
Research Training (IGERT) Program to “meet the need for a cadre of broadly prepared PhDs with multidisciplinary backgrounds and the technical, professional, and personal skills essential to addressing the varied career demands of the future.” Unfortunately, NSF restricted eligibility in the program to “academic institutions in the United States and its territories that grant the PhD degree,” thus perpetuating the hegemony of formal academics in the educational process and excluding other scientists who potentially have much to offer in this area (e.g., by providing postdoctoral fellowships in applied conservation science or planning).

- Hire more faculty whose professional experience has been gained largely outside the university. These are the people often best equipped to train students for today’s increasing proportion of non-academic jobs. This policy will be tough to implement, as those doing the hiring are academics and, due to conscious or unconscious bias, they will tend to favor their own kind.

- Make degree requirements for students more diverse and flexible. This will mean not rushing students through the degree pipeline and will result in longer graduate tenures. Require that students take the time to develop skills that are not gained in traditional courses or thesis/dissertation research. These skills include 1) familiarity with the flora and fauna of regions of interest, including identification skills, competence with survey methods, and basic knowledge of life histories; 2) familiarity with applicable state and federal environmental laws and policies; 3) superior communication skills, written and oral; 4) other interpersonal skills, including an ability to function well in an interdisciplinary team; 5) conversely, an ability to work independently as a self-motivated, self-disciplined professional; 6) thorough knowledge of general biology, ecology, and conservation biology; 7) good knowledge of experimental design principles, spatial analysis and mapping (GIS), research methods, and statistics. Added coursework can help students develop some of these skills, but it is not necessary to require students to take a slew of lecture courses in the humanities and other fields. Rather, integrated, field-based or other practical, “hands-on” courses are preferable.

- Demand that students understand the philosophical underpinnings, value dimensions, and historical context of science. Most scientists today are ignorant of these areas. Require appropriate coursework or independent studies in the history of science, philosophy of science, environmental ethics, and related areas.

- Require extensive internships at undergraduate and graduate levels. Internships will probably be more effective at preparing students for real-life conservation work than all courses and thesis research combined. Potential internships include work with land-managing and environmental regulatory agencies, consulting firms, conservation groups, law firms, nature centers, and land trusts.

What do conservation biologists do for a living? Many work or study in colleges and universities. Some teach at high schools or outdoor schools. An increasingly large number work for local, state, and federal agencies, conservation organizations, research stations, consulting firms, and industry. Many are self-employed as consultants and freelance writers or photographers. And sadly, a good number are unemployed or under-employed because the universities they attended did not prepare them for life outside academia. This must change. It will only change when the self-serving bureaucrats who now restrict the educational process to narrow disciplinary bounds are booted out and replaced by far-seeing individuals who are willing to break down traditional barriers and work together for common goals. A few universities have made the necessary transition; most steadfastly resist it. The world needs professionally trained and well-rounded conservation biologists in a variety of posts, and students deserve the best and most relevant education we have to offer. Let’s get on with it.

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